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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/347,583	06/30/99	NI	T LAM1P111/P05

022434  
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IM22/1011

EXAMINER

BROWN, C

ART UNIT

PAPER NUMBER

1765

DATE MAILED:

7  
10/11/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.  
09/347,583

Applicant(s)  
Ni et al.

Examiner  
Brown  
~~First Last~~

Group Art Unit  
1204



1763

☒ Responsive to communication(s) filed on Jul 26, 2000

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 1-13 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-13 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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### **DETAILED ACTION**

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Singh (US 6,042,687) in view of Su (US 5,552,124).

From line 42 to the end of column 5, Singh disclose a plasma processing system and method for processing substrates such as by chemical vapor deposition or etching. The plasma processing system comprises a substrate support assembly and a processing chamber enclosing the substrate support. The substrate may be a semiconductor substrate having diameters such as 4", 6", 8", and 12", etc. The substrate support includes an electrostatic shuck for supporting the wafer and at least one electrode supplying an RF bias to the substrate. The substrate support assembly includes a gas ring at both ends of the substrate. Such rings are referred to as focus rings which balance the gas flow above the substrate. Focus rings are sometimes referred to as diffusion barriers because they inhibit diffusive transport of gaseous reactants and byproducts near the substrate perimeter. The diffusion barrier inhibits higher gas flow at the substrate edge to avoid non-uniform processing of the substrate. A substrate passivating gas is injected so as to be concentrated near the periphery of the substrate to achieve uniform etching or deposition on the substrate. This reads on the limitation of a barrier having a first position wherein the first position

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relative to the wafer substantially facilitates etch uniformity for a chemically driven etch process and having a second position relative to the wafer wherein the second position relative to the wafer does not interfere with the etch uniformity of an ion driven etch process.

Unlike the instant invention, Singh does not disclose an apparatus which has a movable barrier wherein the first position is capable of restricting diffusion of gases over the wafer within the plasma processing apparatus to the wafer.

In column 4, Su discloses a movable focus ring, which acts as a diffusion barrier. The focus ring is used to shield the wafer during wafer processing in a plasma reactor. The focus ring includes a first slotted opening, where the two openings cooperate to provide a balanced gas flow distribution across the wafer surface, such that process uniformity is achieved across the wafer surface. The focus ring displaces chamber volume and thereby stabilizes gas flow within the chamber. The focus ring has a circular, an eccentric, or a baffle configuration to provide uniform gas flow distribution across the wafer surface. The wafer is supported by a wafer pedestal which is positioned over a cathode base. The wafer is shielded by a focus ring that rests on the pedestal and that surrounds the wafer.

It is the Examiner's position that a person having ordinary skill in the art would have found it obvious to modify Singh with the movable focus ring disclosed by Su since Singh also uses focus rings as diffusion barrier. The substitution of a movable focus ring in place of a stationary focus ring would have been anticipated to produce an expected result.

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3. Applicant's arguments filed July 26, 2000 have been fully considered but they are not persuasive.

In traversing the rejection based on the combination of Singh and Su, applicants state that Singh does not teach or remotely suggest a processing chamber for a chemically driven etch process and an ion assisted etch process. The teaching of a plasma processing chamber is not commensurate with the claim language. The applicants state that Singh does not disclose a barrier as described in independent claims 1 and 8. This point is not clearly understood since Singh discloses a diffusion barrier that inhibits diffusive transport of gaseous reactants and byproducts near the substrate perimeter. The applicants also state that the gas ring used in Singh is not the same as a focus ring. This point is not clearly understood since the gas rings used in Singh are used to balance gas flow above the substrate, just as focus rings are used to balance gas flow above the substrate. Focus rings are referred to as diffusion barriers. The applicants have not stated how Singh's brief mention of a diffusion barrier does not teach that of which the claimed invention asserts.

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after


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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication from the Examiner should be directed to Charlotte A. Brown whose telephone number is (703)305-0727.

CAB

October 10, 2000

  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700